

ROMANIA'S POSITION IN THE TRANSEUROPEAN TRANSPORTATION NETWORKS

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Summary

As Romania's European integration proceeds, this country is attracting even more attention due to geostrategic and economic reasons. The 9th TEN-T core network corridor Rhine-Danube (with road, rail and waterway components) is the backbone network of Romania's international connections. In order to increase economic growth and living standards, the development of transportation infrastructure is strongly required, similar to other post-Communist countries in Central and Eastern Europe. Furthermore, the transport system should be organised and developed in a manner, in which the different carriers should take over the part of the transport chain, which could operate in the most cost-efficient manner. The legacy of the Communist era (underdeveloped transport system) still causes enormous problems in nowadays' transportation issues, therefore Romania is investing with the impressive financial support of the European Union mainly in a (still scattered) motorway network, as well

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as in the rail, air and shipping transportation. The key aspects of these investments are the development of high-traffic linkages with the neighbouring countries, which would allow a better integration into the TEN-T network, strengthening the relationship with the Caucasian region and the Middle East as well. The construction of connecting motorways between regions is also highly required and an urgent task. Nevertheless, the development strategy is under strong political pressure rising concerns in terms of the rapidity of overcoming this disadvantageous situation.

1 Historical development of Romania's transportation system

Romania can be divided into three large areas. The country's relief is determined by the Carpathian Mountains [Carpații] in the middle of the country, serving as a natural barrier limiting the Carpathian Basin in the East and separating the western and central parts of Romania from the other regions of the country. This area encompassed by the Carpathians in the North, East and South is Transylvania [Ardeal],

Figure 1: Landscapes and cultural regions of Romania



separated from the Great Hungarian Plain [Alföld, Câmpia de Vest] by the West-Transylvanian Mountains [Munții Apuseni] in the West (MITTELSTRASS 1961, p. 17). The region south to the Carpathians, limited by the Black Sea in the East, and by the Danube [Dunărea] in the South, is known as Wallachia [Țara Românească]. The region beyond the Eastern Carpathians [Carpații orientali], adjacent to the Republic of Moldova and the Ukraine is referred to as Moldavia [Moldova] (see Fig. 1), the northern section of which is called Bucovina.

A further apportionment of Romania can be carried out in the country's westernmost area. The region between Satu Mare, Oradea and Arad, which comprises the eastern part of the Great Hungarian Plain, is called Crișana, also Partium. Located in the Romanian-Hungarian-Serbian border triangle, Timișoara is the centre of the Banat region, bounded by the Danube in the South, and the foothills of the Southern Carpathians [Carpații meridionali] in the East. The South of Romania (Wallachia) is also divided into smaller regions. Thus, the area between the Danube and the Olt carries the name Oltenia (having Craiova as its centre), and the region east of it is called Muntenia. There, Romania's capital, Bucharest [București], is located. The Southeast of the country, the portion between the coast of the Black Sea and the Danube, with the famous Danube Delta [Delta Dunării], is Dobruja [Dobrogea] (see Fig. 1).

The surface area of Romania with its 238,400 square kilometres, corresponds roughly to the area of the Federal Republic of Germany before 1990. With about 22 million inhabitants, Romania is the most populous country in South-East Europe.

The country is showing a strongly increased traffic volume since the early 1990s, increased even more since the accession to the European Union (EU). The position on several European transport corridors, particularly of great importance for transit traffic from Central to South-East Europe (Greece and Turkey), is another reason for the growing demand in the transportation sector. Reasons for present and expected traffic problems in the transport sector due to historical and current developments will be shown in the following chapters. Also possible solutions will be offered.

In the examination of the transport infrastructure of Romania, it is crucial to take into consideration its historical development as well. The State of Romania arose in 1859 through the union of the two principalities, Wallachia and Moldavia, to the Principality (1862) and Kingdom (1881) of Romania with Bucharest as its capital. In the year 1878 Dobruja, belonging to the Ottoman Empire before, was annexed, through which Romania obtained direct access to the Black Sea (GRIMM 1993, p. 12). As a result of the First World War many frontiers of European countries have been redrawn, partially arbitrarily.

Figure 2: Development of Romania's territory in the 20th century

On June 4th, 1920, the Treaty of Trianon was signed in Versailles's Trianon Palace, through which the Carpathian Basin had been politically re-arranged. Its consequences are still being felt. Romania had been awarded the largest areas – in relation to the other states –, namely Transylvania and the eastern part of the Great Hungarian Plain summing up to a total surface area of over 102,000 km², thanks to which the Romanian state territory doubled. Today's Romanian eastern border had been established only after the Second World War (GRIMM 1993, p. 12).

The new borders had a significant impact on economic development in the Carpathian Basin. They separated historically developed economic entities, the economic regions' arteries, roads and railways, were interrupted. Significant industrial cities, such as Timișoara and Oradea, lost their hinterlands and therefore their markets and a large part of their labour-force potential. In particular Timișoara had been hit hard, for it had been an even more significant business location in 1910 than the capital Budapest itself. Timișoara became a frontier town in the triangle of Romania, Hungary and Yugoslavia.

The ridges of the Carpathian arch had for many centuries represented not only a natural border, but also a political one. For a long time Transylvania has been regarded a "fortress created by nature" as a "strong, far bastion of the West against the eerie, fear

and terror spreading cavalcades of the East" (MITTELSTRASS 1961, p. 17). Pass roads for the improvement of trade were not developed for military reasons, thus until the First World War, the road and rail network was substantially independent on both sides of the Carpathians. Nevertheless, since the separation of Transylvania from Hungary and its annexation to Romania, several national and regional roads have been built (GRIMM 1994, p. 91). Given the strong increase in motorised individual and road freight traffic, these roads have reached the limits of their capacity.

Figure 3: **Development of Romania's railway network**



In these more than 90 years of Romania's existence in its present form, despite some efforts, it has not yet succeeded to provide efficient transport routes between Transylvania and the eastern and southern parts of the country – i.e. a union of the two large halves of the country. The natural barrier of the Carpathians will remain to be the primary reason for different rates of development of the regions (regional disparities) in the future. In the course of European integration, there are aspirations and specific projects to improve the traffic situation in the country by well-constructed road and rail links.

2 Current situation of Romania's transportation system

2.1 Overview

As in other countries of Central and South-East Europe, an expansion of the infrastructure is urgently needed in Romania, because of the poor traffic conditions. The following shortcomings are to be brought into line (see DVWG 2002, p. 45f.):

- Due to long-term maintenance neglect, infrastructure of all modes of transport is insufficient.
- The road network (especially the expressway network) resembles a patchwork and has numerous gaps to be closed.
- The dense railway network is mostly single track and only for low speed.
- Cross-border road and railway connections are insufficient due to a lack of international cooperation.
- Traffic growth is confined to road transport.

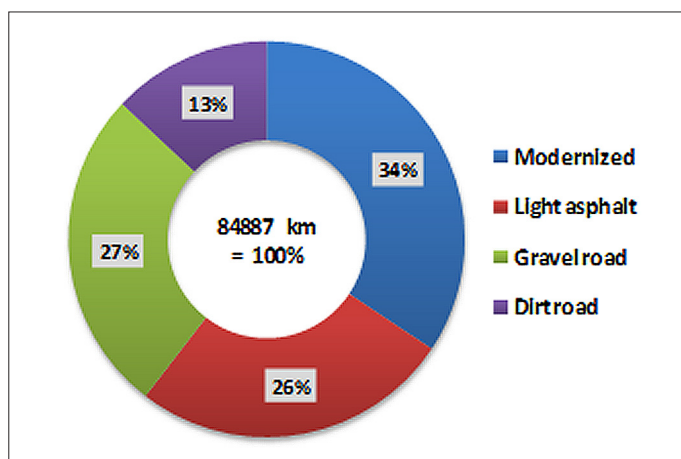
The adjustment of the transport axes is important for the entire European continent. It cannot be achieved solely through regulatory means, since transport policy must be based on the progressive integration of transport markets. This is of crucial importance, since the proper functioning of the common European market depends on an efficient transport infrastructure. Completion of trans-European transport networks is one of the prerequisites for economic integration (see DVWG 2002 p. 12).

2.2 Road network

The road and rail network has not been expanded in the postwar period by purpose. Romania, particularly in the Ceaușescu era, held the opinion, that an efficient transport network would allow rapid advancement to Bucharest in case of a war attack. Ceaușescu propagated after the break with the Soviet Union in 1968 an independent, national-Communist Romania. Only the Danube river ports and the seaport Constanța were massively developed to be able to maintain trade relations with Western countries. They were to provide for the much-needed foreign currency and to avoid transport through Communist 'brother countries'. Due to this traffic policy, Romania built in the Communist period only two motorways – the only ones up to 2004. One of them linked Bucharest with the industrial city of Pitești and had a length of 96 kilometers at that time. The second was a 17 kilometer long section of the highway Bucharest – Constanța, which crossed the Danube between Fetești and Cernavodă. The rest of the country, such as Moldavia and Transylvania, did not have a single kilometer of motorway.

Currently the entire road network of Romania is 84,887 km long, and it is composed of 17,110 km national roads (including 6,188 km European roads), 67,777 km county and communal roads, and only 695 km motorways.¹ Compared to other Central and Eastern European countries, Germany or the EU average, Romania had a low road density at the end of the 1990s, and it has not become significantly denser since then. In 1997, road network density was of 305 meters per square kilometer compared to 708 in Czechia, 1,137 at the EU average and 1,799 in Germany. Also the meter per capita ratio is low: 3.2 (DVWG 2002, p. 13).

Figure 4: **Romania's road network by road surface at the end of 2013** (Source: NATIONAL INSTITUTE OF STATISTICS 2014)



During the last decades only a few European roads have been developed. Thus, for example, the sections between Oradea and the Hungarian border (Borş), and four lanes between Cluj-Napoca and Turda, whereas existing roads were only widened and barriers and bypasses have been waived or constructed, respectively. Generally there are hardly any beltways, even after the turn of the millenium, on the European roads with heavy traffic throughout Romania (except for the bypass roads of Sibiu and Braşov made during the last few years). The predominant settlement pattern can significantly slow down inter-regional traffic, as the road villages can often be four to eight kilometers long. However, since in most localities separate routes for cyclists and carriages are missing, they need to share the main roads. Since thereby the average speed of motorised personal transportation and cargo traffic is further reduced, this results in long travel times between the individual upper and middle centres. At this point as an example may be mentioned the drive from Cluj-Napoca to Braşov. This

¹ Source: TEMPO database, NATIONAL INSTITUTE OF STATISTICS

needs 4.5 hours for the 280 km long road by car. In comparison, the train ride (331 km) between the two cities takes up to almost 6 hours and 25 minutes.

In the 1990s, road traffic in Romania increased by 47% within ten years. The annual increase was approximately 7% in this period. 65% of all traffic and over 90% of international traffic is handled via national roads, so that they are extremely stressed (see MLPTL 2001). This development, which can also be observed in other post-Communist countries to a similar extent, has several reasons. A strong increase is noticed especially in cargo transport as a result of a dilapidated railway network and lack of flexibility of rail-cargo transport in the 1990s, hence the disproportionate increase in road-cargo transport. A large increase in motorised individual transport adds to this. Despite this tendency, very little has been invested into the road network since 1990, except for the renovation of the main transport/European roads. The same applies to the railway network, wherein in relation to the roads, even less has been invested into infrastructure and superstructure. Both passenger and cargo traffic have low travel speeds.

Figure 5: Road traffic congestion according to the GTMP (AMPOST 2015)

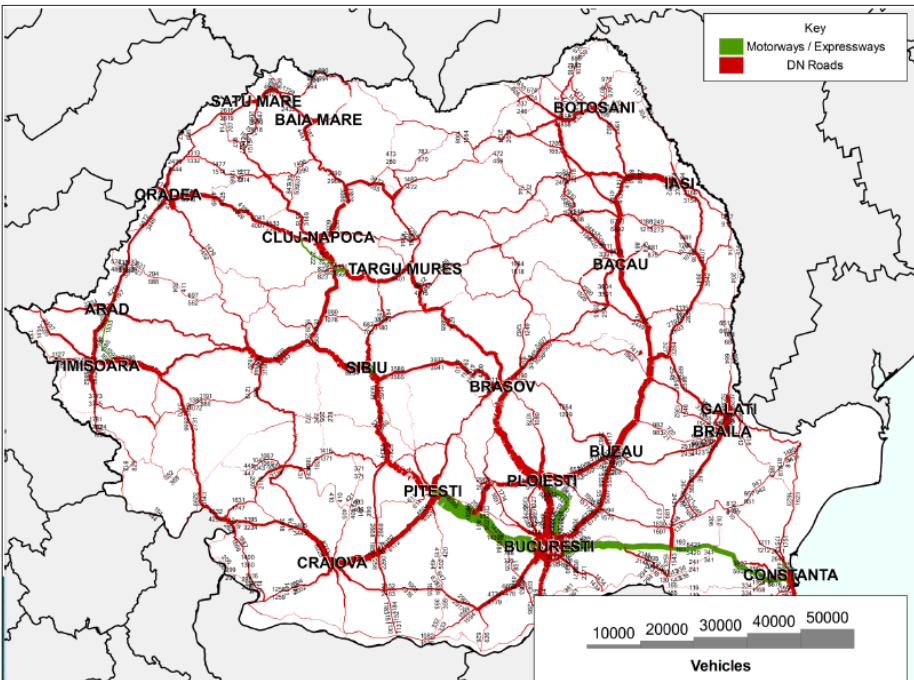
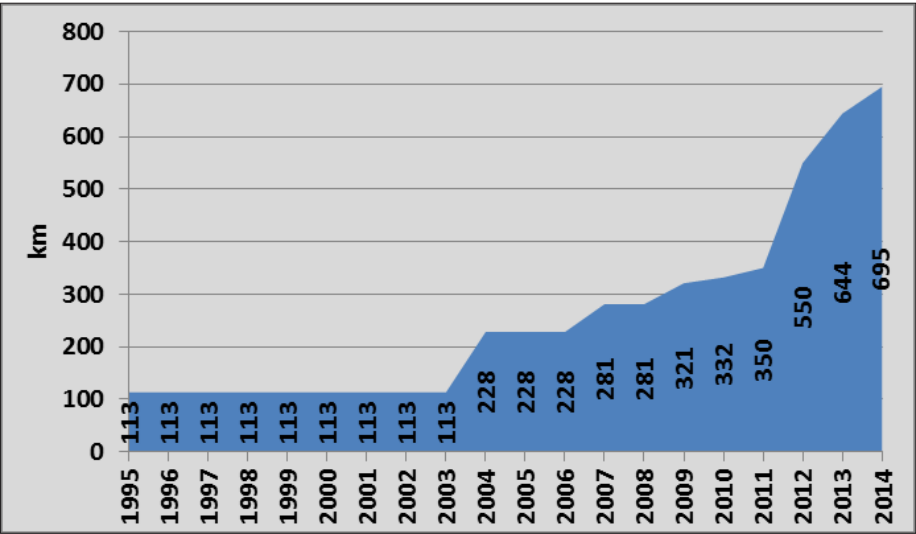


Figure 6: **Length of Romania’s motorway network**



Source: NATIONAL INSTITUTE OF STATISTICS 2014

As Figure 6 shows, starting 2004, after years of stagnation, the length of the motorway network slowly but steadily increased. In comparison to other European countries in 2004 there are still too few kilometers of motorways in Romania. While Germany had nearly 13,000 kilometers of motorways in 2011, there were only 350 km in Romania. Significantly smaller states in Central and Eastern Europe have a better network of motorways, such as Czechia (729 km), Hungary (1,273 km) or the southern neighbour Bulgaria (437 km). Even Slovakia has a 416 km long motorway network. Just small EU member states, in terms of surface, such as Lithuania and Cyprus, have fewer motorway miles. Malta and Latvia have no motorways. However, in the period from 2011 to 2014, the length of the Romanian motorway network doubled to 695 kilometers, mainly (by 85%) due to of the EU-funded motorway A1 (Nadlac – Arad – Timișoara – Lugos – Deva – Sibiu).

Figure 7: Romania’s motorway network in 2015

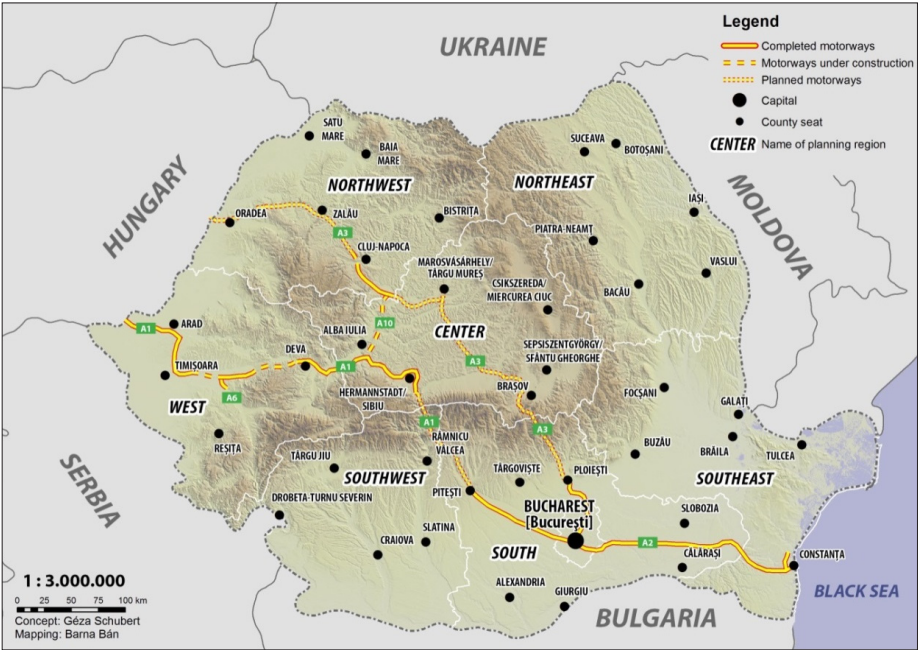
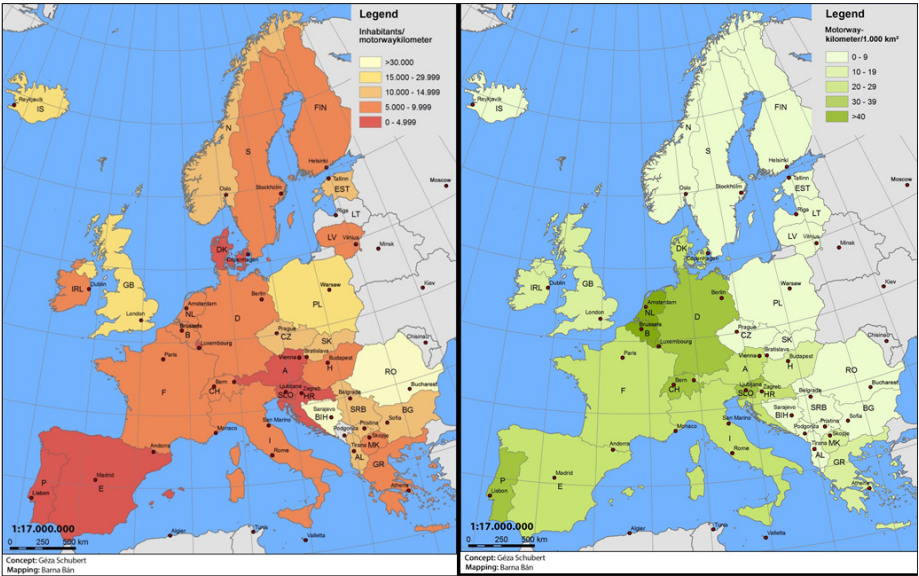
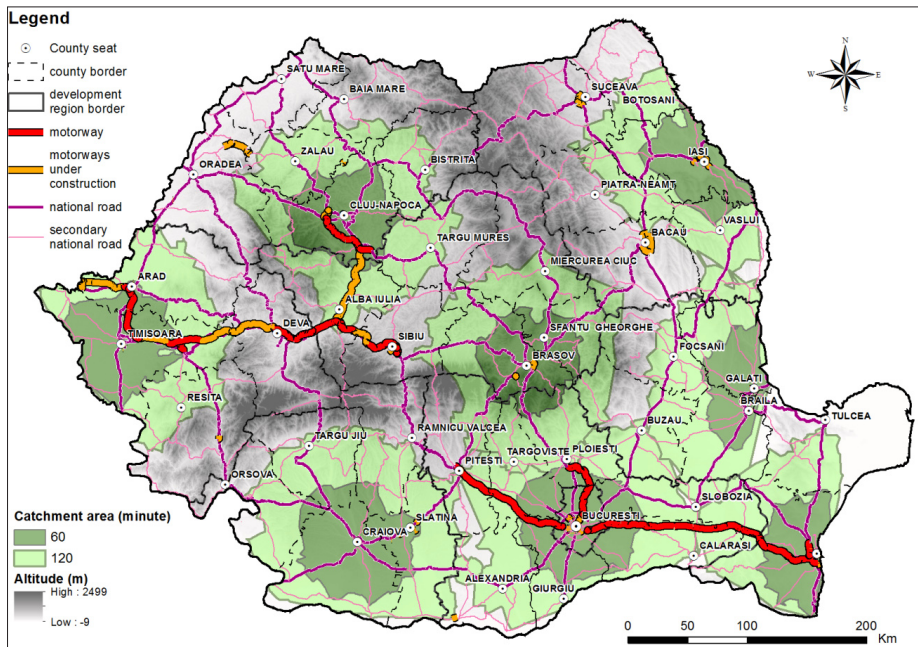


Figure 8: Motorway density in Europe (Source: EUROSTAT database 2012)



The Eurostat data serves as better comparison, based on size and population of a country. Figure 8 shows that among all countries with highways, with only two kilometers of motorway per 1.000 km², and 36,400 inhabitants per km of motorway, Romania holds one of the last places in comparison to the European average.

Figure 9: **Catchment area of major cities (with more than 250,000 inhabitants) based on travel time in 2014 (own edition)**



2.3 Railway network

After the first railway line on the present territory of Romania had been opened in 1854 between Anina and the Danube port Baziaș more railway lines were inaugurated during the following years in Banat and Partium. Only in the year 1870 was this isolated network connected to the railway system of Austria-Hungary. The inauguration of the first railway line in the Principality of Romania (Cernavodă – Constanța) was in 1860. In 1869 followed the Giurgiu – Bucharest railway track. By the commissioning of the first crossing of the Carpathians in 1870 (Simeria – Petroșani) the rail networks of the Principality of Romania and Austria-Hungary were linked for the first time. By 1914 seven other rail lines connecting the two countries followed. There were different priority settings on both sides regarding the network links. From the perspective of

Austria-Hungary there was no need for the construction of railway lines between the two countries, but the expansion of rail lines within the country was more of a priority.

After 1918 (i.e., with the inclusion of Transylvania in Romania), efforts were made to adapt the railway network to the requirements. Since the construction of railway lines over the Carpathians involved, and still does, enormous costs and risks, only a few projects have been realised.

Between 1950 and 1990, the length of the Romanian railway network changed only negligibly, from 10,853 to 11,348 kilometers. During the same period, however, a large increase in capacity has been recorded. During Communism, the railways benefited on the prioritisation of rail-cargo traffic, which was accompanied by heavy industrialisation. In particular, the development of heavy industry resulted in a sudden increase in bulk transport (coal, steel). Most investments into infrastructure and superstructure of the railway system were made in the 1960s and 1970s (see TURNOCK 2003, p. 242). Investments in the railway system were urgently needed at this point: In 1970, only 10% of the railway network was expanded to double track and only 2% was electrified, while during 1990 this proportion was 26% to 32.4%. The current situation in absolute terms: of the 11,000 kilometer long Romanian railway network about 8,000

Figure 10: Current railway network in Romania



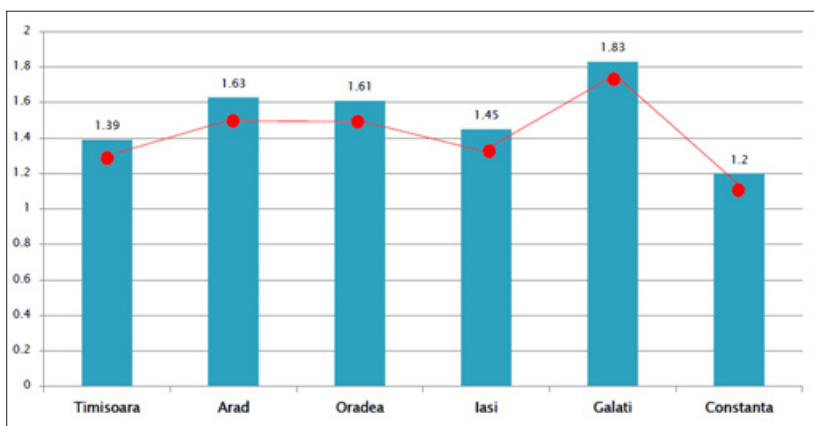
kilometers are single-tracked and merely 3,000 km double-tracked. The electrification rate is 36%. A total of approximately 3,950 kilometers are electrified, 1,530 of it being single-tracked and 2,300 double-tracked routes.

Of all the new EU-member countries, Romania has the second-longest network with 10,785 kilometers behind Poland. Over the past 10 years, however, the number of employees and passenger-kilometers almost halved, and in consequence Romania slipped in these categories even behind Czechia. Romania holds the third place behind Poland and Czechia in rail-cargo transport, with about 12.4 billion ton-kilometers. In relative figures this meant in 2009 a rail-cargo share of 19.4% – as in Poland. In the same period Hungary (20.6%) and Czechia (22.1%) carried more goods by rail (see EUROSTAT database 2015).

The Romanian railway network has to be subject to an overall modernisation, thus being able to compete with air and road transportation, thereby also gaining admittance to the trans-European transportation network. Therefore, the Romanian government prioritises the modernisation of the railway lines along the European transport corridors, and a further electrification of rail lines.

The importance of investment in railway infrastructure has been revealed in a survey, carried out as part of the new General Transport Master Plan of Romania² (hereinafter GTMP), which measured the average speed of cars and trains in the passenger transport sector (see Fig. 11). Travel time to Bucharest from six cities was compared, resulting in data proving that the trip only lasts half as long by car,

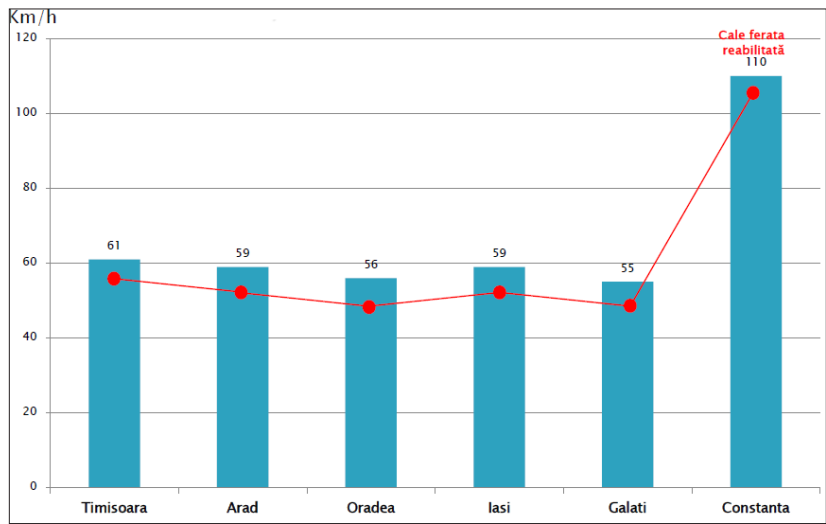
Figure 11: **Comparison average speed car vs. railway from six cities to Bucharest (according to the GTMP, in %) (AMPOST 2015)**



² elaborated by AECOM Ingineria LTD for the Ministry of Transportation

compared to the average time it takes a train to get there. An exception is the route Bucharest – Constanța with only 20% more by train. This is due to the fact that the railway line has been renovated in the 2000s, which allows twice the average speed (110 km/h) (as compared to the five other destinations) (see also Fig. 12).

Figure 12: **Comparison average speed car vs. railway from six cities to Bucharest (according to the GTMP; in km/h) (AMPOST 2015)**



According to the modified GTMP presented by the Romanian Minister of Transport, Ioan Rus, in February 2015, the budget planned to be invested in the railway infrastructure between the years 2014 and 2030 sums up to a total of 18.838 billion Euros (thus 7.7 billion Euros less than for the road network). The main focus is especially on the modernisation and electrification of the main routes (3,219 km) with partial increase of the maximum speed to 160 km/h and the modernisation of railway lines “with economic potential” (1,131 km), the electrification (including modernisation: 425 km) and the strengthening of rail infrastructure with increasing the speed (1,001 km). In addition to investments in rail infrastructure, the superstructure is also to be further developed, through the acquisition of 90 locomotives (AMPOST 2015).

According to the GTMP, investments will be made during the above-mentioned period in the following railway lines:

Table 1: **Planned investments in railway lines, according to GTMP (AMPOST 2015)**

<i>Electrification of railway lines</i>	
<i>Relation</i>	<i>Length</i>
Cluj-Napoca – Episcopia Bihor	152 km
Craiova – Calafat	96 km
Timișoara – Stamora Moravița	56 km
București – Giurgiu	88 km
Dărmănești – Vicșani	30 km
TOTAL	422 km
<i>High speed routes (railway)</i>	
<i>Relation</i>	<i>Length</i>
București – Constanța	225 km
București – Craiova	209 km
București – Pitești	108 km
București – Brașov	166 km
București- (Ploiești Tj) – Buzău	72 km
București – Giurgiu	88 km
Timișoara – Arad	57 km
Iași – Pașcani	76 km
TOTAL	1,001 km

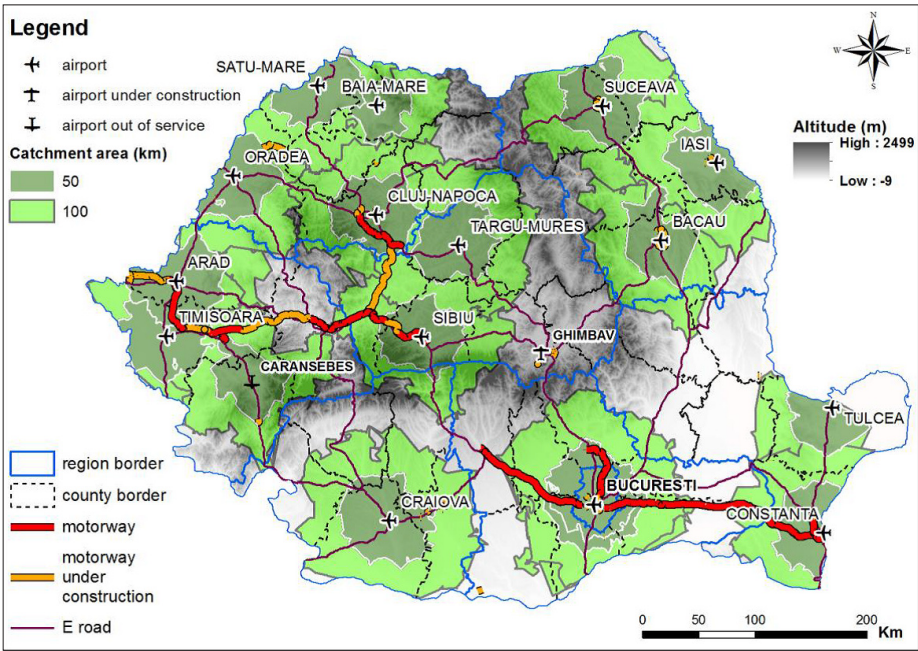
It is remarkable that the preferred routes are the TEN-T corridors and the star-shaped railway lines tapering Bucharest. This shows very well (more or less inadvertently) the priorities of the Romanian transport investment policy into railways: better integration into the European rail network (through expansion of transit routes) and the focus on the Bucharest region within a radius of up to 200 kilometers. The threat of disconnecting of regions in north and north-east Romania is real in this case as well, as in the case of the planned investment in a motorway and expressway network. In addition, if the focus is on the main routes, secondary roads lose their appeal, line closures are to be expected.

2.4 Airports

Since there were 17 civil airports built during the Socialist era, which – in Central and Eastern European terms – resulted in quite a high density of airports (Fig. 13), the integration of air traffic posed the slightest challenge to the government.

In technical terms, the modernisation of airports and associated navigational and operating equipment requires considerably less time and expenses as compared with other transport sub-sectors; thus, it comes as no surprise that we can witness the most spectacular development in the field of air transport. The process has been further accelerated by the fact that following Romania’s 2007 EU accession, crossing borders has become much simpler, on the one hand, while due to the entry into force of the Single European Sky regulation³ low-cost airlines appeared all over the major airports, applying a highly favourable pricing policy and offering a multitude of destinations to the EU core region, on the other hand. Consequently, we can talk about an explosive growth as both air passenger transport and the number of aircraft movements have multiplied in a couple of years. Thus we can find in the period of 2006-2007 three Romanian airports among the ten most dynamically developing EU airports. In addition, Cluj-Napoca International Airport came out on top, while the two Bucharest airports – Băneasa and Otopeni – were ranked seventh and eighth, respectively.

Figure 13: Airports and their catchment area in Romania (own edition)



³ SES legislative framework consists of four basic regulations: N° 549/2004, 550/2004, 551/2004 and 552/2004.

Due to the steady increase, the realised passenger traffic exceeded the ten million mark for the first time in 2010. Then, the development stagnated in the wake of the worsening economic situation. In fact, 2013 brought a slight decrease (0.1%), but in parallel with the economic consolidation the sector would register again a massive increase of 16% in the year 2014, setting the record high in passenger traffic (11,714,879) with 127,743 aircraft movements.

The presence of low-cost airlines provided the main driving force behind this spectacular development as well as the key to the development of rural airports. In this respect, Wizz Air (Cluj-Napoca, Timișoara and Târgu Mureș), Carpatair⁴ (Timișoara as hub), Blue Air (Sibiu, Bacău) etc. take up prominent positions, while in February 2015 Ryanair also announced an increased future market engagement. There-fore, everything indicates that market conditions are favourable and the aviation sub-sector holds out further potential.

However, the favourable overall picture is somewhat overshadowed by the fact that with all the firming passenger traffic data there are relevant differences in the performance of airports operating traffic. In fact 87.7% of traffic was operated by no more than three airports, namely 'Henri Coandă' Airport Bucharest (8,316,705 passengers/2014), Cluj-Napoca International Airport (1,182,047 passengers/2014) and 'Traian Vuia' International Airport Timișoara (735,058 passengers/2014).

This is another case that hints the strong focus on the capital city. The priority status of Bucharest is ensured by the presence of the large national airline companies, the intercontinental flights and, on the whole, its disposal of the widest range of destinations. Rural airports, representing the secondary front-line, somewhat lessen the dysfunctions arising from the spatial distribution of major airports, but for the population of the country the accessibility of international flights depends on the public road/railway accessibility of the above-mentioned three cities. Therefore, the development of air transport cannot be conceived either without an integrated development concept of the transport sub-sectors. In addition, we must remark that 89.5% of the air passenger transport falls within the category of international flights – the main reason for this situation is that foreign low-cost flights do not operate domestic flights, leaving TAROM national airline company without competition, and therefore giving it green light to apply high ticket prices. According to the statistics of scheduled flights regarding both departures and arrivals, Munich [München] ranks first among foreign destinations with 347,722 from/351,787 for passengers, followed by London-Luton with 267,887 from/278,020 for passengers, Rome [Roma]-Fiumicino with 261,747 from/260,129 for passengers, Vienna [Wien] with 252,591 from/250,120 for passengers, Milan [Milano]-Bergamo with 205,240 from/210,664 for passengers and Paris-Charles de Gaulle with 195,340 from/190,982 for passengers. Further destinations also rank prominently such as Istanbul [İstanbul] (179,958/176,848), Amsterdam (174,665/185,380) and Barcelona (160,463/160,865). In terms of departures by country,

⁴ In 2010 it had operated flights from ten national airports, offering 34 international destinations and 380 flights/week, now it is facing great difficulties.

Italy was the most attractive location (1,106,466 passengers), but Germany (757,597 passengers), Spain (514,640 passengers) and the United Kingdom (425,900 passengers), too, did not lag far behind.⁵ Basically, the massive trend of working abroad and the associated seasonal commuting are reasons for the spectacular passenger traffic data. Low-cost flights prove to have competitive prices against other long-distance transport facilities, first of all against international bus services. Passenger traffic operated by charter flights shows a more oscillating distribution due to the strong exposure of the tourism industry to the economic situation. Traffic (186,668 passengers) registered in 2013 shows a 36% decrease as compared with 2012, while it amounts to no more than 1.7% of the entire civilian passenger traffic. As for the regional distribution of airports, the area west of the Carpathian range may be considered the most balanced region since, besides the airports of Cluj-Napoca and Timișoara that play the hub role, Târgu Mureș (343,521 passengers/2014) and Sibiu (250,400 passengers/2014) can also take pride in a significant amount of traffic, while the airport built in Ghimbav⁶, near Brașov, will also start operation soon and will probably go on to obtain a regional role. In the case of Moldavia, the airports of Bacău (313,376 passengers/2014) and Iași (273,047 passengers/2014) had a medium traffic load in 2014, whereas Craiova, the only operational civil airport in Oltenia, served 138,866 passengers in the year under discussion. In the light of this, we can say that in particular the capital city and the western half of the country managed to integrate into international air traffic.

Based on a master plan, all civilian airports in use were divided into four categories within a hierarchical system, where 'Henri Coandă' Bucharest Airport gets the main position due to its distinguished international relationships. The next level comprises airports of regional interest that function as international distributors, which already dispose of a significant traffic capacity: Cluj-Napoca, Timișoara, Bacău, Iași, Sibiu and Craiova. The third level includes several small-sized regional airports such as Târgu Mureș, Constanța, Oradea, Baia Mare, Brașov, Suceava and Tulcea. This latter category provides a more heterogeneous picture as Târgu Mureș had a passenger traffic in 2013 and 2014 exceeding that of Craiova and Sibiu, both ranked one notch above. On the other hand, this category also contains the newly built, modern airport near Brașov as well as Constanța Airport, again with a relevant tourism potential. The lowest level of the hierarchy is occupied by three airports altogether: the smaller-sized Bucharest Băneasa, serving mainly domestic flights; the airports of Satu Mare and Arad along the western frontier.

Obviously, besides infrastructural characteristics, the size of the catchment area served and the passenger traffic statistics, spatial location was also a vital argument when dividing airports into categories. Even so, the procedure remains to be disputable. A fine example of this is the position of Brașov and Sibiu airports, as the average public road distance between the latter and the cities of Cluj-Napoca and

⁵ according to the Air Transportation Statistic Bulletin 2013, edited by NATIONAL INSTITUTE OF STATISTICS

⁶ 2,820 meter long, and 45 meter wide runway already finished

Bucharest, respectively, is larger than that of the former one, and, what is more, the urban agglomeration around Braşov⁷ gives home to nearly half a million inhabitants, while this metropolitan area clearly includes the whole of Covasna County and two-thirds of Harghita County as well.

The medium-term development strategy of the air traffic sub-sector foresees an amount of 588 million Euros for the development of aerodromes. 'Henri Coandă' Bucharest Airport is in a prioritised position since its development agenda includes a significant increase of capacity as well as the modernisation of the terminal and the technical equipment. The breakdown of costs assigned to the beneficiary airports is shown in the table below.

Table 2: **Allocated funds for airport development program, according to GTMP (AMPOST 2015)**

<i>Project</i>	<i>Estimated Costs (Million Euros)</i>
'Henri Coandă' Bucharest Airport	247.3
Bacău Airport	86.6
Timişoara Airport	78.3
Sibiu Airport	51
Craiova Airport	46.6
Cluj-Napoca Airport	38.1
Tulcea Airport	17
Iaşi Airport	10.8
Tg. Mureş Airport	4.2
Suceava Airport	3.2
Baia Mare Airport	2.3
Constanţa Airport	1.6
Oradea Airport	1.2

2.5 Shipping

While air traffic at the beginning of the 21st century experienced an upswing, shipping shows no similar gains. According to EUROSTAT, in 2013 39.52 million tons were transported on inland waterways in Romania, representing approximately 13% of the revenue of German rivers. Depending – amongst other factors – on the water level, the transported amounts vary annually. Consequently Romania is in a European

⁷ Braşov metropolitan area, <http://www.metropolabrasov.ro/>

comparison still far behind Germany (298.758 million tons), France (302.997 million tons) and Spain (422.152 million tons), but also Estonia (43.503 million tons) and Lithuania (41.033 million tons). The neighbouring Bulgaria, however, can be exceeded by about 13 million tons (see EUROSTAT database 2015).

Figure 14: Navigable waterways and ports in Romania



In the past, particularly in the Ceaușescu era (1965-1989), the expansion of the Danube and the maritime ports have been greatly forced and thus promoted shipping. This was the so-called “aspiration for independence” of Romania, established within the Warsaw Pact countries, through which the country opened up especially to the economic policy of the Western states. But since the transport of goods by land was not possible without the Socialist countries’ tangent, the investments have been especially prioritised in seaports. Therefore the still existing, but outdated infrastructure serves as a basis for modernisation, and thus as further stimulation to reviving the Romanian Danube and seaports. This is particularly encouraged by the EU as well.

According to the GTMP modified at the beginning of 2015, approximately 2.096 billion Euros have to be invested over the next 15 years, only a fraction compared to road and rail, wherein these estimated costs may vary depending on the type of client (i.e. the state) and on the desired measures to be taken and investments to be made.

The amount of approximately 1.636 billion Euros would cover the modernisation and expansion of over 752 kilometers of waterways and the infrastructure of 12 ports to be developed (AMPOST 2015).

Table 3: **Waterway projects according to the GTMP (AMPOST 2015)**

	<i>Name of the project</i>	<i>Length (km)</i>	<i>Estimated costs (mio. EUR)</i>
1	Improving navigation conditions of the joining Romanian-Bulgarian Danube section	585	103,3
2	Danube-Bucharest channel	104	1,508
3	Sulina channel	63	25
	TOTAL investments waterways	752	1,636.3

Of the total amount of 460.1 million Euros to be invested in ports, a bulk of it, equalling 351 million Euros, is intended for the port of Constanța – the largest on the Black Sea. This emphasises the continued excellent domestic and international (geo-) strategic role of the port. It is also the EU's declared objective to intensify the trade of goods i.a. with the Caucasian area and the Middle East through the port of Constanța. The remaining approximately 109 million Euros will be invested in the development of the ports lying on the TEN-T corridor: Drobeta-Turnu Severin, Calafat, Giurgiu, Cernavodă and Galați, and also further ports, on the Danube (Corabia, Basarabi, Tulcea, Oltenița, Orșova, Moldova Veche) (AMPOST 2015).

A remarkable feature of the investment listed in Table 3 is the planned further construction of the Danube-Bucharest channel, planned since 1880, that was completed to 60% in 1986-1990. The finalisation of the Danube Canal funded by the EU is intended to provide access for Bucharest to international water transport routes.

3 Major goals regarding the transport infrastructure development strategy

In order to achieve the balanced development of the transport system – that would enhance economic competitiveness and productivity while also leading to positive changes in the citizens' living standards –, there is an inevitable need for a well thought-out and efficient strategy. In view of the current state of the transport system (state of the infrastructure, quality of services), it is our belief that the fundamental pillars of the transport-development strategy must be represented by the following elements:

- I. Smooth integration into the TEN-T network: better connectivity with neighbouring countries and transportation corridors
- II. Significant improvement of spatial relations (interconnections) between regions and also between the major cities of the country
- III. Significant improvement of the transport infrastructure quality
- IV. Sustainable transport system and logistics operations

Practically, a significant progress should be secured on two fronts simultaneously, which seems to be hardly feasible considering the economic potential of the country. Romania has to ensure the construction of developed international transport links allowing high traffic capacity, while – given the underdevelopment of the domestic links – the motorway construction programme and the rehabilitation of railway lines cannot be circumvented either. As a matter of fact, both conditions have to be fulfilled for the optimal operation of the system. The bottleneck in this issue is represented by the financial possibilities, which is why the drawing down of non-refundable subsidies granted by the EU and their rational utilisation is of paramount importance for Romania. Therefore, the establishment of the strategy must take into account the EU's interests and the routes of the TEN-T network corridors. The TEN-T network expansion plans approved at the end of 2013 offer major advantages for Romania, giving it the green light to the construction/modernisation of new domestic links by co-financing from EU resources.

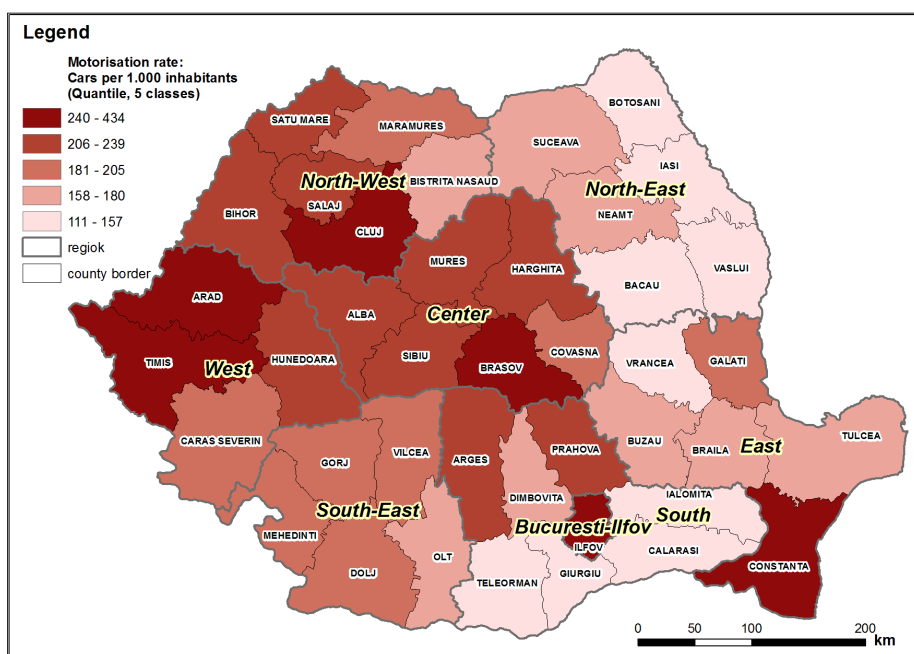
Currently, land transport in Romania is slow and highly expensive compared with the quality of services and the average income. The country takes up the last position in the EU in terms of motorway length per capita and motorway density, while the average speed of the trains is about 50-60 km/h. At the same time, the number of vehicles registered in circulation is on a constant rise, whose direct results are an increased load level of public roads and extremely poor traffic safety indices at the EU level. There is an imbalance between transport demand and supply, also signaled by an increasing social unrest and pressure on the decision-makers.

Although Romania's motorisation rate (235 cars/1,000 inhabitants, 2013) lags far behind some of the more developed EU-member states, such as Italy (621 cars/1,000 inhabitants), Germany (530 cars/1,000 inhabitants) or Hungary (301 cars/1,000 inhabitants)⁸, there is an undeniable growing tendency. In the course of the last ten years, they registered a growth of nearly 65%, a process unbroken by the economic crisis. All that happened was a shift of focus from the entry into service of newly manufactured cars (2.9% in 2013) to imported second-hand motor vehicles. The recently revealed road network development plan also foresees a growth in the motorisation level; the National Transport Model's 2020 scenario has a 26% growth expectation, while it predicts 350 cars/1,000 inhabitants by 2030 at an average rate of

⁸ based on: EUROSTAT database

5% growth per annum. At the same time, the gaining ground of second-hand motor vehicles adversely affects the average age of the vehicle fleet. While in 2007 the proportion of passenger cars under two years old was 12.3%, this number plummeted to 2.6% in 2013, whereas the proportion of passenger cars older than ten years changed from 37% to 57%.⁹ Changes that have taken place in the age composition of the vehicle fleet can, in fact, be explained by the sharp changes on the input side. At the same time, the vehicle fleet that shows an aging trend poses several problems regarding the full effectiveness of traffic safety, energy conservation and environment protection.

Figure 15: **Motorisation rate in Romania** (own edition 2013)



Source: ROMANIA'S NATIONAL INSTITUTE OF STATISTICS

Considering the regional distribution of vehicle supply, significant disparities take shape, but the overall conclusion is that there is a higher motorisation rate in the case of more developed and urbanised counties. Owing to its metropolitan role, the smaller catchment area of Bucharest gives home to the highest number of vehicles put into circulation. Registering a value of 434 cars/1,000 inhabitants that comes close to the developed countries, the capital city tops a list whose runner-up, Timiş

⁹ based on: EUROSTAT database

County (273 cars/1,000 inhabitants), lags far behind scoring a 37% decrease rate.¹⁰ It is interesting, however, that based on the economic performance one of the poorest-ranked counties, Vaslui, registered the sharpest growth in ten years, achieving a 118% increase as compared with 2003.

In the case of Romania, the traffic safety indices of 2003-2008 moved in quite the opposite direction from the slow improvement process characteristic of the EU member states (MÁTHÉ 2011). By comparison, in 2008, while Romania registered 148 traffic accident-related casualties per one million inhabitants, Germany – a country with twice as high a motorisation rate as that of Romania – registered only 54.5 such cases; even Hungary closed the year under the 100 mark. In the subsequent period, the indices show a positive trend, revealing a 38% improvement by the year 2012. The high proportion (33%) of accidents occurring in inner city areas and those involving pedestrians still remains a major issue. Over the last decade, no progress can be demonstrated whatsoever in this respect! Romania registers 40.4 pedestrian casualties per 1 million inhabitants, whereas the corresponding average value of the EU-27 is 12.3.¹¹ Both categories draw attention to the deficiencies of the road transport system.

The national transport strategy has to address these challenges and seek to overcome them. In point of fact, several key documents have been issued regarding this matter, out of which Law No. 363 of 21 September 2006 on the approval of Spatial Planning of the National Territory – Section I – Transportation Networks is of particular importance. Further, the ‘Romania 100’ government programme (late 2013) is again of great topical value, incorporating the transport development policy. Since the events following the period of transition point at the fact that Romania is incapable of producing significant results in-house, the transport development projects supported by the Large Infrastructure Sectoral Operational Programme 2014-2020¹² (6.843 billion Euros) operating under the aegis of the European Committee, are of key importance regarding the implementation of the measures envisaged. Taking account of the 2014-2020 programming period, the latter is based on the General Transport Master Plan of Romania elaborated in 2014 and finalised in February 2015.

Some of the unfortunate characteristics of strategy formulation are overcapacity and lack of consistency. This latter feature proves its validity in particular when it comes to the motorway network route and its funding options. In fact, GTMP covers all transport sub-sectors. Valid until 2030, GTMP provides for the construction of about 1,300 km of motorways, 1,887 km of express roads, 293 km of EuroTrans roads, 2,854 km of trans-regional roads and a single stretch of bypass road (175,8 km) – the estimated total cost will probably exceed 26 billion Euros. By 2020, however,

¹⁰ Source: TEMPO database, NATIONAL INSTITUTE OF STATISTICS

¹¹ General Transport Master Plan for 2014-2030, pp. 79-80.

¹² Transport Development Operational Programme between 2007-2013, <http://www.ampost.ro/>

Romania can look forward to no more than a 3.7-billion-Euro¹³ support for road transport development, which forecasts serious issues in implementation.

Figure 16: **Planned motorway and expressway network according to GTMP (AMPOST 2015)**



Nevertheless, the priority list that would cover the schedule and funding of the GTMP projects has not yet been finalised, because the European Commission has to accept the government proposal.

Interestingly, for certain sections of the motorway (e.g. Târgu Mureș – Iași), the project foresees a two-stage implementation: the construction of an express road in the first stage, which would then be developed to motorway standards. The government is experimenting again with adopting the PPP system in the construction of the Craiova – Pitești (121 km) and Brașov – Comarnic – Ploiești (105 km) sections.

¹³ 2.7 billion Euro from the Cohesion Fund (which includes the co-financing from the state budget) and 2.1 billion Euro from the European Regional Development Fund

4 Conclusions

The realisation of an efficient network connectivity is the result of a multistage process: the first step provides for the linking of the main national transport arteries and their connection to the international transport corridors as well as the inclusion of highly-ranked settlements, followed by improving the accessibility of lower-ranked settlements.

Beyond any doubt, Romania's and the EU's lines of interest concerning the development of the transport network converge only up to a certain point. The top of the EU-priority list includes the establishment of the high-capacity land transport links covering the Black Sea coastline, Greece and Turkey (Rhine-Danube Corridor, Orient/East-Med Corridor). Further, the EU's position has not changed in respect of the 2014-2020 period¹⁴, given that the Rhine-Danube Corridor is in fact the continuation of the former TEN-T Priority Projects 7, 18 and 22. In contrast, Romania is unable to do away with the underdeveloped connectivity of the historical regions, which is why it is straining every sinew to solve this internal problem by use of EU funds whenever possibility arises. At the end of 2014, the EU rejected the government's request to interchange the TEN-T Core and TEN-T Comprehensive networks, forcing the government to radically modify its transport development strategy. At the same time, the peripheral position of the country as well as its adjacency with three non-EU countries entail its lack of hubs of international importance, thus reducing its geostrategic importance, too. However, expanding the TEN-T network in December 2013¹⁵ is a minor success, adding the Transylvania-Moldavia and Bucharest-Moldavia transport links to the TEN-T Core corridors (Horizon 2030).

Halting implementation and, subsequently, the agony of the transport development programme are the results of conflicting political interests. It is a fact that several serious bottleneck issues have not yet been settled such as the relief-ring roads of the Prahova Valley, the Olt Valley, Bucharest and the big cities bypass opportunities, the poor technical level of railway lines and the problems surrounding the river-bed conditions complicating inland navigation. Overcoming the natural geographic barriers and establishing optimal links between Moldavia and the major international TEN-T corridors have not yet been realised either.

It reveals the strong politicisation surrounding the development programme that the version of the Master Plan released for public debate (December 2014) did not include the Sibiu-Pitești motorway project – although this linkage had been part of the European core transport network for 20 years –, but instead the Brașov-Comarnic-Ploiești route was marked as a priority. Considering the previous failures

¹⁴ Regulation (EU) No. 1316/2013 of the European Parliament and of the Council of 11 December 2013 establishing the Connecting Europe Facility

¹⁵ Regulation (EU) No. 1315/2013 of the European Parliament and of the Council of 11 December 2013 on Union guidelines for the development of the trans-European transport network

of such attempts, it represents a serious threat that, according to the GTMP, they plan on constructing the Braşov-Comarnic-Ploieşti motorway in the PPP system. Moreover, the cost-effectiveness of such alternative forms of implementation as the two-stage motorway construction, particularly in hilly and mountainous areas, is also questionable. Due to insufficient government resources and EU support for the full implementation of the GTMP, there is still a great deal of uncertainty surrounding the timetable of constructing the key motorways. The big question is whether this 'isolated' construction will continue to be adopted in the future too, or the government will switch over to a more rational timetable that meets the specific economic needs. In addition, yet another elucidation is needed as to the future government support of the elements implemented subsequent upon the public debate.

Taking into account the international transport integration, successes have been produced exclusively in the field of air transport, which, however, can only partly be attributed to the central government measures. Therefore, Romania continues to face serious challenges and it needs to enhance the effectiveness of its measures in order to dispose of an efficient and modern transport system by the year 2030.

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